

REMARKS

By this Amendment, claims 1, 5, 10, 17, 19 and 20 are amended, claim 7 is cancelled without prejudice or disclaimer to the subject matter therein and claims 21-26 are newly added. Support for the amendments to claims 1, 5, 10 and 17 and new claims 21-26 may be found throughout the original disclosure. Claims 19 and 20 are merely to correct antecedent basis. No new matter has been added. After entry of this Amendment, claims 1-6, 10-12 and 17-26 will remain pending in the patent application. Reconsideration and allowance of the present patent application based on the foregoing amendments and following remarks are respectfully requested. Since this Amendment is being presented together with a Request for Continued Examination, entry of this Amendment is respectfully requested.

Claims 13-15 were rejected under 35 U.S.C. §102(b) based on Lai (U.S. Patent No. 6,034,805). Claim 8 was rejected under 35 U.S.C. §102(b) based on Carter (U.S. Patent No. 4,900,137). Claim 9 was rejected under 35 U.S.C. §103(a) based on Carter. Claim 16 was rejected under 35 U.S.C. §103(a) based on Lai in view of Leger (U.S. Patent No. 5,627,847). Claims 8-9 and 13-16 are withdrawn without prejudice or disclaimer, thus rendering moot the rejection of these claims.

Claims 1, 2, 7, 10 and 11 were rejected under 35 U.S.C. 103(a) based on Mori (U.S. Patent Application Publication No. 2002/0154282) in view of Lai. The rejection is respectfully traversed.

Claim 7 is cancelled without prejudice or disclaimer to the subject matter therein, thus rendering moot the rejection of claim 7.

Claim 1 recites a lithographic apparatus comprising, *inter alia*, a beam delivery system comprising redirecting elements to redirect said beam along a beam path that extends from a radiation source to an illumination system wherein said radiation source is arranged to provide a beam having a predetermined polarization state and said redirecting elements are arranged to provide a minimum polarization related radiation loss, and wherein said beam delivery system is constructed and arranged to maintain the predetermined polarization state relative to each of said redirecting elements, said redirecting elements disposed along said beam path such that a plane of incidence of at least one of said redirecting elements intersects a plane of incidence of at least another one of said redirecting elements.

Mori fails to teach or suggest these features. As mentioned in Applicants' Amendment of January 30, 2006 (hereinafter the "January 30 Amendment"), Mori discloses a

correction apparatus for correcting a shift between optical axes in two separate optical units of an exposure apparatus. (See paragraph [0016] of Mori). Mori discloses that the apparatus includes a light source unit 10, an optical system 20 and an apparatus body 30. (See FIG. 1 of Mori). The apparatus body 30 includes the correction apparatus 100, which comprises mirrors 110 and 130 (identified by the Office Action as the “redirecting elements” of claim 1), tilting members 112 and 132, drive units 114 and 134, Fourier lens 140, half mirror 150, detection optical system 160 and controller 170. (See paragraph [0048] of Mori).

However, unlike claim 1, Mori is silent as to a beam delivery system configured to maintain the polarization state relative to each of the redirecting elements, much less relative to redirecting elements that are arranged such that a plane of incidence of at least one of said redirecting elements intersects a plane of incidence of at least another one of said redirecting elements. As can be seen in FIGS. 1-5, 8B, 9-10 and 12 of Mori, the plane of incidences of the redirecting mirrors are parallel to each other.

Lai fails to remedy the deficiencies of Mori. As indicated in the January 30 Amendment, Lai discloses an optical system for use with a deep-UV laser that includes mirrors arranged such that the reflections on the mirrors are of s-polarization. (See FIGS. 1 and 2 of Lai). Lai discloses that the optical system eliminates high loss reflection of p-polarization. (See col. 2, lines 64-65 of Lai).

However, unlike claim 1, Lai fails to disclose, teach or suggest a beam delivery system configured to maintain the polarization state relative to each of the redirecting elements, the redirecting elements disposed along said beam path such that a plane of incidence of at least one of said redirecting elements intersects a plane of incidence of at least another one of said redirecting elements. To the contrary, Lai teaches that in order to eliminate high loss reflection of p-polarization, “the first mirror 1 and the second mirror 3 are such located and oriented so that the beams 21, 22 and 23 all stay approximately in an imaginary plane parallel to the base plate 6.” (See col. 2, lines 57-65 and FIGS. 1-2 of Lai). Therefore, in Lai, the planes of incidence of the redirecting mirrors are parallel to each other.

Accordingly, any reasonable combination of Mori and Lai cannot result, in any way, in the invention of claim 1.

In addition, for at least the same reasons set forth in the January 30 Amendment, Applicants respectfully submit that there is no motivation or suggestion to combine the teachings of Mori and Lai.

First, Mori merely discloses that if the mirrors are replaced by a prism type optical member, the incident beam should have a p-polarization and the sides of the optical member should be tilted at the Brewster angle and is silent as to the polarization when mirrors 110 + 130 are used. (See paragraphs [0052]-[0060] of Mori).

In contrast, Lai merely discloses an arrangement of mirrors used to reflect S polarization radiation, a teaching that is in a different direction and away from Mori's. Thus, it is respectfully submitted that it would not have been obvious to one of ordinary skill in the art to modify Mori in view of Lai. (See MPEP 2143).

It is also noted that the modification of Mori's embodiment dealing with the polarization of the radiation beam in view of Lai would render Mori unsatisfactory for its intended purpose. Specifically, Mori teaches using a p-polarized beam in conjunction with a prism to enhance the reflections of the beam within the prism. By contrast, Lai discloses using an s-polarized beam in the optical system. Clearly, the use of an s-polarized beam with the prisms of Mori would reduce the internal reflections within the prisms, thus defeating the intended purpose of Mori. Therefore, Applicants respectfully submit that there is no motivation for the suggested combination.

The Examiner alleged that "it would have been obvious to one of ordinary skill in the art ... to modify the radiation system of Mori to include redirecting elements constructed and arranged to maintain the polarization state of the beam for at least the purpose of providing a more sufficient polarized beam to the projection system." However, this *post hoc* justification for the asserted combination is clearly based on an improper application of hindsight based on Applicants' own specification. There is no indication that Mori intends to provide a "more sufficient polarized beam to the projection system." As mentioned previously, Mori is not concerned with maintaining the state of polarization relative to each of the redirecting elements. As such, Applicants respectfully submit that there is no motivation or suggestion for the asserted combination.

For at least these reasons, Applicants respectfully submit that the Office Action has failed to establish a *prima facie* case of obviousness per MPEP 2143.

Claim 2 is patentable over Mori, Lai and a combination thereof at least by virtue of its dependency from claim 1 and for the additional features recited therein.

Claim 10 is patentable over Mori, Lai and a combination thereof for at least similar reasons as provided in claim 1 and for the additional features recited therein. Namely, claim 10 is patentable over Mori, Lai and a combination thereof at least because claim 10

recites a device manufacturing method comprising, *inter alia*, directing a beam of radiation having a predetermined polarization state along a beam path through a plurality of redirecting elements to an illumination system, the directing being performed such that polarization-related radiation losses are reduced and such that the predetermined polarization state relative to each of said redirecting elements is maintained, said redirecting elements disposed along the beam path such that a plane of incidence of at least one of said redirecting elements intersects a plane of incidence of at least another one of said redirecting elements.

Claim 11 is patentable over Mori, Lai and a combination thereof at least by virtue of its dependency from claim 10 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1, 2, 7, 10 and 11 under 35 U.S.C. 103(a) based on Mori in view of Lai are respectfully requested.

Claim 12 was rejected under 35 U.S.C. 103(a) based on Mori in view of Lai and Leger.

Claim 12 is patentable over Mori, Lai and a combination thereof at least by virtue of its dependency from claim 10, which is patentable over Mori and/or Lai as discussed above, and for the additional features recited therein.

Leger fails to remedy the deficiencies of Mori and Lai. Leger merely relates to a method for making a distortion-compensating phase-adjustment element for a laser. However, Leger is silent as to the features of claim 12, including the features of claim 10 recited hereinabove. Therefore, any reasonable combination of Mori, Lai and Leger cannot result, in any way, in the invention of claim 12.

Furthermore, for at least the same reasons provided in the January 30 Amendment, Applicants respectfully submit that there is no motivation or suggestion to combine Leger with Mori and/or Lai.

The Office Action indicated that "it would have been obvious to one of ordinary skill in the art ... to further modify the beam of Mori, as modified, by having a substantially square cross section of radiation for at least the purpose to reduce the number of beam of reflections." However, and as mentioned in Applicants' last Response, this *post hoc* justification for the asserted combination is clearly based on an improper application of hindsight based on Applicants' own specification, (see paragraph [0052] of the present application), which is clearly prohibited by the Rules. Specifically, the Examiner is respectfully reminded that "the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on

applicant's disclosure." (See MPEP 2143 citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), emphasis added). In the present case, for example, there is no indication that Mori is concerned with the beam cross-section. As such, Applicants respectfully submit that there is no motivation or suggestion for the asserted combination.

Accordingly, reconsideration and withdrawal of the rejection of claim 12 under 35 U.S.C. 103(a) based on Mori in view of Lai and Leger are respectfully requested.

Claims 3-6 and 17 were rejected under 35 U.S.C. 103(a) based on Mori in view of Lai and Takahara *et al.* (U.S. 2002/0067546) (hereinafter "Takahara"). The rejection is respectfully traversed at least because there is no motivation for the suggested combination.

Claims 3-6 are patentable over Mori, Lai and a combination thereof at least by virtue of their dependency from claim 1, which is patentable over Mori and/or Lai as discussed above, and for the additional features recited therein.

Takahara fails to remedy the deficiencies of Mori and Lai. Takahara relates to a polarization conversion optical system that converts light having a nonuniform plane of polarization into light having a uniform plane of polarization. (See paragraph [0018] of Takahara). However, Takahara is silent as to a beam delivery system configured to maintain the predetermined polarization state relative to each of the redirecting elements, said redirecting elements disposed along said beam path such that a plane of incidence of at least one of said redirecting elements intersects a plane of incidence of at least another one of said redirecting elements. Accordingly, any reasonable combination of Mori, Lai and Takahara cannot result, in any way, in the invention of claims 3-6.

Claim 17 is patentable over Mori, Lai, Takahara and a combination thereof for at least similar reasons as provided for claims 3-6. Namely, claim 17 is patentable over Mori, Lai, Takahara and a combination thereof at least because this claim recites a method of manufacturing employing radiation of a predetermined polarization state, comprising arranging a radiation system to provide a beam of radiation with said predetermined polarization state, the radiation system including dielectric mirror elements to redirect the beam from a radiation source and at least one polarizer arranged between at least two of said dielectric mirror elements to modify said radiation to an s-polarization state relative to the dielectric mirror elements, said dielectric mirror elements disposed such that a plane of incidence of at least one of said dielectric mirror elements intersects a plane of incidence of at least another one of said dielectric mirror elements.

Furthermore, and as mentioned previously, Applicants respectfully submit that there is no motivation or suggestion to combine the teachings of Mori with those of Lai.

The Examiner alleged on page 8 of the Office Action that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the radiation system of Mori, as modified, by including a half lambda plate as a polarizing plate utilized in a manner described above for at least the purpose to utilize the efficient amount of light.” Applicants respectfully disagree.

As mentioned previously, Mori is not concerned with a beam delivery system configured to maintain a predetermined state of radiation relative to each of the redirecting elements. As such, one of ordinary skill in the art would not be motivated to include a polarizing plate, much less a half lambda plate, to modify a polarization state of the radiation beam, as recited in claims 3 and 4.

Moreover, unlike claim 5, Takahara is silent as to a polarizing plate that is in contact with one of the redirecting elements. Takahara merely teaches that the plate 52 is detached/separate from element 51. Therefore, Applicants respectfully submit that Takahara does not teach or suggest the features of claim 5.

The Examiner alleged on page 8 that “it would have been obvious ... to further modify the radiation system of Takahara by having the polarized plate integral with at least one of said redirecting elements for at least the purpose of providing a more substantial polarized beam.” Applicants respectfully disagree. This *post hoc* justification for the asserted combination is clearly based on an improper application of hindsight based on Applicants’ own specification. There is no indication that Mori intends to provide a “more substantial polarized beam.” As mentioned previously, Mori is not concerned with a beam delivery system configured to maintain the state of polarization relative to each of the redirecting elements. As such, Applicants respectfully submit that there is no motivation or suggestion for the asserted combination.

Furthermore, Applicants respectfully submit that there is no motivation to modify Mori in view of Lai and/or Takahara.

For example, if one were to modify Mori in view of Lai, one would end up with a lithographic apparatus supplied an s-polarized radiation beam and including parallel mirrors 110 and 130 arranged such that the s-polarization is parallel to the surface of the mirrors 110 and 130, as taught by Lai. As such, one would clearly not be motivated to further modify this arrangement by providing a polarizer between mirrors 110 and 130 (identified as the redirecting elements in the Office Action) to modify the radiation to an s-polarization state.

Clearly, the use of such a polarizing plate would not benefit or enhance Mori's modified apparatus.

In addition, Applicants respectfully submit that the modification of Mori's embodiments dealing with the polarization of the radiation beam in view of Lai would render Mori unsatisfactory for its intended purpose. Specifically, Mori teaches using a p-polarized beam in conjunction with a prism to enhance the reflections of the beam within the prism. By contrast, Lai discloses using an s-polarized beam in the optical system, and Takahara merely discloses changing the polarization state with a half lambda plate. Clearly, the use of an s-polarized beam, as suggested by Lai, would defeat the intended purpose of Mori because it would reduce the internal reflections within the prism. Therefore, Applicants respectfully submit that there is no motivation for the suggested combination, *per* MPEP 2145.

Accordingly, reconsideration and withdrawal of the rejection of claims 3-6 and 17 under 35 U.S.C. §103(a) based on Mori in view of Lai and Takahara are respectfully requested.

Claims 18-20 were rejected under 35 U.S.C. §103(a) based on Mori in view of Lai, Takahara and Leger. The rejection is respectfully traversed.

Claims 18-20 depend from claim 17 and are patentable over Mori, Lai, Takahara and any combination thereof for at least the same reasons provided above in connection with claim 17, and for the additional features recited therein. Further, Leger fails to overcome the shortcomings of Mori, Lai, and/or Takahara by failing to disclose, teach or suggest a method of manufacturing using radiation of a predetermined polarization state, comprising arranging a radiation system to provide a beam of radiation with said predetermined polarization state, the radiation system including dielectric mirror elements to redirect the beam from a radiation source and at least one polarizer arranged between at least two of said dielectric mirror elements to modify said radiation to an s-polarization state relative to the dielectric mirror elements, said dielectric mirror elements disposed such that a plane of incidence of at least one of said dielectric mirror elements intersects a plane of incidence of at least another one of said dielectric mirror elements.

Furthermore, Applicants respectfully submit that there is no motivation or suggestion to modify Mori in view of Lai and/or Takahara.

The Examiner alleged that "[t]he ordinary artisan would have been motivated to further modify Mori as modified in a manner described above for at least the purpose to reduce the number of beam reflections." However, and as mentioned previously, this *post hoc* justification for the asserted combination is clearly based on an improper application of

hindsight based on Applicants' own specification, (see paragraph [0052] of the present application), which is clearly prohibited by the Rules. Specifically, the Examiner is respectfully reminded that "the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (See MPEP 2143 citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), emphasis added). In the present case, for example, there is no indication that Mori is concerned with the beam cross-section or any motivation or suggestion in Mori or Leger to have a certain beam cross-section in the claimed invention. As such, Applicants respectfully submit that there is no motivation or suggestion for the asserted combination.

Accordingly, reconsideration and withdrawal of the rejection of claims 18-20 under 35 U.S.C. §103(a) based on Mori in view of Lai, Takahara and Leger are respectfully requested.

Applicants have addressed all the Examiner's rejections and objections and respectfully submit that the application is in condition for allowance. A notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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